

# Performing the Diagnostic Laparotomy for Chronic Small Bowel Disease

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Most of these patients are over 10 years old, and many are over 15 years old. Many have lost substantial weight, and half of them have neoplasia in the small bowel. Therefore, it is imperative that surgery be performed quickly and with minimal stress to the patient. One of the major causes of surgical complications is prolonged surgery time. This impacts on hypothermia, another major cause of death. The following protocol has been used in over 300 cats in my practice. This document lists the procedures and techniques that we use.

## A. Pre-anesthetic workup

1. Reasonably good physical examination
2. Chemistry panel with electrolytes to include TT4 if over 10 years of age or palpable thyroid.
3. CBC
4. Careful cardiac auscultation
5. Electrocardiogram
  - a. Single lead tracing is good for screening.
  - b. The VetChek is quick because it uses a chest lead.
    - i. [www.dvmsolutions.com](http://www.dvmsolutions.com); 1-866-373-9627

## B. Anesthetic induction

1. Isoflurane (or sevoflurane) via face mask.
  - a. Restraint with bath towel ('kitty burrito')
  - b. Correct mask size: large end 5-6" in diameter
  - c. Odor and cleanliness: Do not use the mask on dogs; wash after each use.

## C. Anesthetic maintenance

1. Isoflurane (or sevoflurane) via endotracheal tube

## D. Pre-, Intra-, and Post-operative medications

1. Analgesia
  - a. Buprenorphine-SR; [www.zoopharm.net](http://www.zoopharm.net); see below
    - i. 120 mcg/kg IM or SC
  - OR
  - b. Buprenorphine
    - i. 0.02 mg/kg IM or SC
2. Pre-op Antibiotics
  - a. Convenia (cefovecin) (8 mg/kg SC); Zoetis
  - OR
  - b. Baytril (2.5 mg/kg q12h SC) + ampicillin (20 mg/kg q12h SC) q 12 hours for 3 days
3. Intra-op Meds
  - a. Atropine (0.05 mg/kg IV) PRN for bradycardia
4. Post-op Meds
  - i. Acepromazine (We dilute 10 mg/ml product with sterile saline 1:10 - making a 1 mg/ml concentration – and administer at 0.1 mg/kg IM or SC) for rough recovery

## E. Surgical monitoring

1. Desirable parameters
  - a. Electrocardiogram
  - b. Heart rate
  - c. Respiration rate
  - d. Pulse oximetry
  - e. Blood pressure
  - f. Core body temperature
  - g. End tidal CO<sub>2</sub> (Capnography)

2. Monitor I use: VetGard; [www.dvmsolutions.com](http://www.dvmsolutions.com)

#### F. Temperature control

1. This is the most difficult body function to maintain because so many cats have lost so much weight.
  - a. Ways to maintain temperature
    - i. IV fluids warmed to body temperature
    - ii. Insulated wrap on fluids.
      - a) Kenna's Kreations; [kenna.mckenney@yahoo.com](mailto:kenna.mckenney@yahoo.com)
    - iii. Warming "beanies" beside the cat. Warning: Easily overheated; can burn the skin. Do not overheat; test it on the skin of your forearm first.
      1. Source: Angel Wilkinson; 800-753-4193; [AngelW44@msn.com](mailto:AngelW44@msn.com).
    - iv. Warming pad on the surgery table and in recovery cage
      1. Chill BUSTER; DVM Solutions; [www.dvmsolutions.com](http://www.dvmsolutions.com)
    - v. Booties on all four feet. Socks made for 6-12 month old babies.
    - vi. Monitoring of core body temperature.: VetGard; DVM Solutions
    - vii. Abdominal infusion of 100 ml of warm saline just before closure for cats that have temperature of 96F or less at the end of surgery.
      1. Note: For 1-3 hours there will be blood tinged fluid drain through the surgical incision; do not re-operate thinking you have active bleeding occurring. The blood is from the liver biopsy site.
    - viii. \*\*\*Surgical time: The longer the abdomen is open, the more the body temperature falls.

#### G. Approach to the abdominal organs

1. Make the body wall incision into the cranial abdomen. It should be about 5 inches (13 cm) long.
2. Removal of the falciform ligament permits much better access to the liver. This is needed in all but emaciated cats. It is virtually avascular, so simply cutting it at its root is all that is needed for removal.

#### H. Liver biopsy

1. Inspect the liver for gross lesions; use a lesion as the biopsy site. However, if these are not found, perform the biopsy at an easily accessed location.
2. Use scissors to make a wedge biopsy. The wedge should be about 1 cm along the liver's edge and about 1 cm deep.
3. Pre-load your needle holder with 4-0 PDS. A single suture is generally enough to appose the edges and stop bleeding. Do not hesitate to put in an additional suture if needed.
4. I find this biopsy to be easier without an assistant's hands in the surgical field. I secure the liver with one hand and cut and suture with the other. It takes about 40 seconds.

#### I. Pancreatic biopsy

1. In spite of what you have been told, you will not induce pancreatitis doing this biopsy.
2. Inspect both limbs of the pancreas. Note that the exocrine duct runs down the middle of both, although it is usually not seen; it must be avoided.
3. Using a 4 mm biopsy punch, sample either the site of a gross lesion or the pancreatic edge near the stomach. Place a finger behind the pancreas at the biopsy site so you can determine how deep to go with the biopsy punch.
4. Note that direct pressure for about 15 seconds is usually enough to induce good hemostasis.
5. If bleeding continues, apply Bleed-X hemostatic powder ([www.dvmsolutions.com](http://www.dvmsolutions.com)) and light pressure for a few seconds. A single suture can be used, but this is less desirable than direct pressure or Bleed-X powder.
6. Because of the size of this tissue sample, it is easily lost in processing. Therefore, it is best to put it in a separate container with formalin. A small red top blood tube is ideal.

#### J. Stomach biopsy

1. The stomach is not typically abnormal. It should have already been examined with ultrasound. If it was normal, quick palpation of the stomach is a good idea, but do not get so aggressive that you damage the pancreas.

2. If the stomach is abnormal on ultrasound (thickened wall) or it is abnormal to palpation, biopsy it. This can be done with a 6 mm biopsy punch or with an elliptical incision in full-thickness fashion. Closure should be performed with 4-0 PDS in two inverting layers.

#### K. Small bowel biopsy

1. Run the bowel from proximal duodenum to the cecum. Biopsy sites are chosen based on gross evaluation and in the thickest areas. Biopsy at least 3 sites.
2. If the bowel is very thick, roll the side of the biopsy punch on the antemesenteric border to flatten it.
3. Using a 6 mm biopsy punch, take a full-thickness biopsy on the antemesenteric border.
4. If the muscularis or mucosa is very thick, it will often bulge through the biopsy site when closure begins. If so, use scissors to trim the bulging tissue.
5. Suture the biopsy site with 4-0 PDS using a simple interrupted through-and-through pattern. Place the first suture in the center of the biopsy site. Place one (or more, if needed) on each side of the first suture. In most cats, three sutures are sufficient for good closure.
6. If the bowel wall is VERY thick, use caution when making knots. Too much tension will cut through the bowel wall. Although this seems like it would happen easily and frequently, it does not.
7. Test the biopsy site by injecting saline into the bowel lumen. Use a 25 ga. needle attached to a 6 cc syringe filled with saline; pass the needle through the small bowel wall at an acute angle into the lumen. Clamp off the bowel on one side of the incision with your thumb and index finger. Have your assistant clamp off the other side in similar fashion. Inject enough saline for the bowel to distend on each side of the incision. If one of you sees fluid leaking through the incision site, immediately release your fingers and stop injecting. If this happens (unlikely), place another suture at the leak site and repeat the leak test.
8. Take two or more additional biopsies.
9. Caution: If the bowel is only slightly thickened, it is possible to be too aggressive and go through the bowel wall on the mesenteric side also. If this happens, it may be necessary to do an anastomosis. This has happened to us once.

#### L. Inspection

1. Inspect the liver and pancreatic biopsy sites for bleeding.
2. Treat appropriately if bleeding is occurring. This is highly unlikely.

#### M. Body wall closure

1. Needs to be secure and fast.
  - a. Muscle wall
    - i. 2-0 PDS or equivalent.
    - ii. Simple interrupted pattern about 0.5 cm apart.
  - b. Subcutaneous tissue
    - i. 4-0 PDS using continuous pattern
  - c. Skin
    - i. 4-0 Braunamid/Polymid using a Ford Interlocking pattern

#### N. Recovery

1. The anesthetic protocol permits very rapid recovery following extubation.
2. Wrap the cat in a warm bath towel
3. Place warming beanies around the bath towel (do not overheat).
4. Chillbuster cage mat; [www.dvmsolutions.com](http://www.dvmsolutions.com)
5. Special note: Watch brachycephalic cats for airway obstruction during recovery.

#### O. Post-op

1. IV fluids and NPO for 24 hours after surgery.
2. Remove catheter and offer food 24 hours after surgery.
3. Hospitalize for 2 nights after surgery. Ideally, the cat should be eating when discharged, but some cats have 'environmental anorexia' and will eat as soon as they return home.

#### P. Modifications for fractious cats

1. Use the Wild Child for induction; [www.veterinaryconcepts.com](http://www.veterinaryconcepts.com)
2. Give IV fluids during surgery at 50 ml/hr.

3. Immediately post-op, stop IV fluids and remove the catheter then give 100-150 ml of subcutaneous fluids.
4. Very fractious cats could be fed at 24 hours post-op then released that afternoon.